Caldasia 24(1) 2002: 191-199

A NEW SUBSPECIES OF APOLINAR'S WREN (*CISTOTHORUS APOLINARI*, AVES: TROGLODYTIDAE), AN ENDANGERED COLOMBIAN ENDEMIC

Una nueva subespecie de soterrey de *Apolinar* (*Cistothorus apolinari*, Aves: Troglodytidae), un endemismo colombiano en peligro

F. Gary Stiles
Paula Caycedo
Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Apartado 7495, Bogotá, Colombia.

ABSTRACT

We describe *Cistothorus apolinari hernandezi*, subsp. nov. from wet páramo of the Sumapaz massif south of Bogotá, Colombia. This form differs from the nominate of the wetlands of the Cundinamarca-Boyacá Plateau in size, coloration, ecology, social structure and song and appears to be isolated from it by some 1000 m of elevation and different habitat preferences. A second population apparently occurs some 300 km further northeast in the Sierra Nevada del Cocuy in Dept. Boyacá but no data exist for intervening páramos. As a species, *C. apolinari* is critically endangered but the wetland and páramo populations face different threats and require different conservation strategies; distinguishing the latter population formally helps call attention to this situation.

Palabras clave. Apolinar's Wren, *Cistothorus apolinari hernandezi*, Colombia, conservation, taxonomy.

RESUMEN

Se describe *Cistothorus apolinari hernandezi*, subsp. nov. de los páramos húmedos del macizo de Sumapaz, al sur de Bogotá, Colombia. Esta forma difiere de la subespecie nominal de los humedales del Altiplano Cundiboyacense en tamaño, coloración, ecología, estructura social y canto y parece ser aislada de ésta por unos mil metros de elevación y diferentes hábitats preferidos. Aparentemente hay una segunda población a 300 km al nordeste en la Sierra Nevada del Cocuy, Depto. Boyacá, pero no existen informes de los páramos entre estos sitios. Como especie, *C. apolinari* está bajo amenaza crítica de extinción, pero las amenazas que enfrentan a las poblaciones de los humedales y los páramos son diferentes; por lo tanto, las estrategias para lograr su conservación también tienen que ser diferentes. El reconocimiento formal de la población del páramo sirve para llamar la atención sobre esta situación.

Key words. *Cistothorus apolinari hernandezi*, Colombia, conservación, Soterrey de Apolinar, taxonomía.

Apolinar's Wren (Soterrey de Apolinar), *Cistothorus apolinari* (known locally as the "Chirriador" or "creaker" in reference to its song, reminiscent of a creaky wagon wheel), occupies a small range in the Eastern Andes of Colombia and is considered critically endangered (Collar et al. 1992) due to extensive habitat loss, mostly during the last 75 years. Its ecology is only rather sketchily known and even its basic habitat requirements have been somewhat uncertain (J. Hernández-Camacho, pers. comm.); brief reviews were presented by Chapman (1917), Borrero (1953), Varty et al. (1986) and Collar et al. (1992). However, recent studies have provided more detailed information on habitat (Morales 2001), social system and song (Caycedo 2001).

Nearly half a century ago, J. I. Borrero (1953) called attention to the fact that there were two distinct populations of *C. apolinari* in the Bogotá region: one, upon which Chapman's description was based, in the wetlands of the Sabana de Bogotá between 2450 and 2650 m (reaching 3015 m at the Lago de Tota in Boyacá), and a second at 3800-3900 m around the Chisacal lake system in the páramos of the Sumapaz massif south of Bogotá. These populations appeared not to be in contact, the intervening elevations being occupied by *C. platensis* (Sedge Wren). He noted differences in size and coloration between birds of the two populations but declined to name the páramo population. Because a larger sample of specimens and recent data on song, ecology and habitat substantiate and extend Borrero´s differentiation, we now do so and propose to call this population

Cistothorus apolinari hernandezi, subsp. nov.

Holotype. Adult male, no. 33788 of the ornithological collection of the Instituto de Ciencias Naturales (ICN), Universidad Nacional de Colombia; collected on 28 April 2000 by Paula Caycedo at Lagunas de Chisacal, Parque Nacional Natural Sumapaz (3800 m; 4º36'N, 74º25'W) and prepared by F. G. Stiles (original no. FGS-3504).

Paratypes. Seven adult males (ICN 3366, 3367, 3368, 3369, 3371, 6796 and 14012), four adult females (ICN 3372, 6794,6797,6798), a juvenile male (ICN 3370) and a juvenile female (ICN 3373), all collected at the type locality by ICN personnel between 1952 and 1961.

Diagnosis. Compared to nominate *apolinari* of the Cundinamarca-Boyacá Plateau, differs in significantly longer bill, wing and tarsus and shorter tail, sex for sex (see Table 1); median underparts much more whitish without strong buffy tinge on lower breast and abdomen; flanks, crissum, lower back, wings and tail slightly paler and more greyish brown. Also differs in habitat, social system and song (see below).

Description of holotype. (Capitalized color names and numbers follow Smithe 1975, 1981). Throat, lower breast and abdomen dingy white, upper breast washed with pale dull buff (near 223D, Tawny Olive); sides and flanks darker buffy-brown (near 223C, Sayal Brown); thighs and crissum more intensely colored, close to 26, Clay Color). Crown, nape and auriculars dull greyish-brown (25, Fawn); superciliary pale greyish-buff (approaching 119D, Light Drab-Grey), set off below by dusky lores and indistinct dusky postocular stripe; malar area Light Drab-Grey, shading into whitish of throat. Mantle brownish-black with broad dull white streaks (along shafts of feathers). Wing-coverts, proximal secondaries, rectrices pale dull brown (between 26, Clay Color and 239, Ground Cinnamon), barred regularly with brownish-black; margins of primaries pale brownish-grey (119D, Drab-Grey). Lower back, rump and upper tail-coverts dull buffy-brown (near 223C, Sayal Brown). Iris dull reddish-brown; maxilla dusky, mandible whitish with tomia and tip horn color, gape dull yellowish, legs and feet light yellowish-horn. Body mass 17.7 g, left testis 4x3.5 mm, skull fully ossified, trace of fat; well-digested insect remains in stomach. Measurements (in mm): exposed culmen 13.2, total culmen 16.5, bill length from nostril 9.35, bill depth at nostril 3.5, chord of folded wing 57.3,tarsus 23.5; tail molting, not measured.

Etymology. We name this form in fond memory of Jorge Ignacio (Mono) Hernández-Camacho, eminent ornithologist and naturalist, whose recent death has deprived Colombia of not only an extraordinarily knowledgable scientist and conservationist, but also a wonderful person (who also continually prodded FGS to describe the páramo population!).

Plumage variation in the type series. The amount of buffy wash across the upper breast appears to vary individually; the holotype actually has a stronger wash than most. Most other variation appears related to age, not sex. The two juveniles differ from adults in being brighter brown above with the mantle streaking reduced to narrow, blurry buffy-brown shaft-streaks on a duller, dusky-brown ground color and only on the midback. The blackish barring on the wing-coverts, inner secondaries and rectrices is coarser and more irregular, becoming nearly obsolete on the outermost rectrices. The facial pattern is blurred and indistinct, the superciliary faint and not set off by dusky. Among the putative adults, several appear to have juvenile-type rectrices, remiges and wing-coverts, with the back pattern more or less intermediate between that of juveniles and adults: darker brown ground color and broader, paler buffy-brown streaks, perhaps a first basic plumage. Birds in this plumage almost always have smaller gonads than birds in definitive plumage taken at the same times of year.

Additional specimens examined. Specimens of both nominate *apolinari* and *hernandezi* in several other museum collections were used to characterize the populations morphologically (Table 1). These include the following (besides the type series of *hernandezi*, mentioned above: *C. a. apolinari*: ICN 3374, 3375,3376,3377; ANSP 159489, 159490; AMNH 130589, 143585, 143588, 146615, 502168, 788485, 788486; ULS 5273, 5274,5275,5276, 5277(see below). *C. a. hernandezi*: ICN22991, ANSP 168000, 168001. ICN 22991 was collected in open páramo at 4000 m in Boyacá: Nevado Güicán, Sierra Nevada del Cocuy by H. Romero on 26 December 1971(Olivares 1973); its sex was not determined but it is probably a female, as it is the smallest in wing and tarsus of all páramo birds measured but is similar in other dimensions and has the extensive whitish underparts of *hernandezi*. Of particular interest is a putative male (ULS 5277) specimen from El Verjón taken by Hno. Nicéforo María in January 1932. This locality is a small páramo lake (el. ca. 3420m) some 8 km ESE of Bogotá, where *hernandezi* might be expected; but its measurements clearly place it with the nominate race, and moreover suggest that it might have been missexed (Table 1). Its coloration appears rather intermediate in that it shows an extensive whitish area on the abdomen, combined with a strong buffy wash on the the breast, with sides and flanks more like those of the nominate form. In the absence of subsequent reports, it is impossible to determine whether this specimen represents a wandering individual from the Sabana de Bogotá or an intermediate, possibly relict population that might no longer exist.

Ecology. *C. a. hernandezi* inhabits swampy páramo in the vicinity of the Chisacal system of glacial lakes between ca. 3800 and 3900 m on the Sumapaz massif of the Eastern Andes. In this area the population is quite dense: PC encountered some 45 groups of wrens along a transect of 5.5 km. Most of these groups contained 5-10+ birds; only one apparently unaccompanied pair was seen. Each group appeared to defend a territory of ca. 1-3 ha, such that the overall density of birds was on the order of 3-6/ha. Vegetation on the territories varied from being dominated by "dwarf forests" of the dense shrub *Diplostephium revolutum* (Asteraceae) to a more open páramo dominated by tall rosettes of "frailejón", *Espeletia grandiflora* (Asteraceae); however, all territories contained stands of the stiff dwarf bamboo *Chusquea (Swallenochloa) tessellata*, which appeared to be required for nesting as all nests found were placed at varying heights in clumps of this bamboo. Also, in all the ground was very boggy underfoot, the dominant ground cover being *Sphagnum* moss, with frequent small pools of open water. Groups of *C. a. hernandezi* sometimes ventured away from the lake margins to forage in shrubbery on the surrounding drier páramo slopes, but always along small streams or boggy areas: they seemed to require the presence of water. By contrast, PC encountered smaller numbers of Sedge Wrens (*C. platensis tamae*) on drier slopes away from water: the two species seem to use different habitats in the area.

Two intensively studied groups of *C. a. hernandezi* (each of ca. 10 individuals) included adults of both sexes and juveniles. Most members of these groups were banded over a period of 8-16 months; nearly all banded birds were still in their groups at the conclusion of the study, indicating that the population is quite sedentary and group

Table 1. Measurements (means, standard deviations, ranges) of specimens of two forms of Apolinar's Wren *Cistothorus apolinari* from the Eastern Andes of Colombia, with results of comparisons (t-tests) between sexes of each form and between forms, for eaxch sex. In parentheses in the column for males from the Sabana de Bogotá are the measurements of the specimen from El Verjón (see text).

Measurement	Sabana de Bogotá		Páramos		Results of t-tests (p)[1]			
	Males	Females	Females		M vs. F		SB vs. P	
					SB	P	M	F
N	10	6	9	6				
Exposed Culmen	12.57±0.29	12.35±0.37	13.93±0.46	13.05±0.34				
	12.3-13.2	11.9-12.9	13.2-14.7	12.6-13.6				
	(12.3)				ns	***	***	**
Length of bill from nostril	9.18±0.35	9.13±0.43	9.56±0.19	9.40±0.39				
	8.6-9.7	8.4-9.5	9.3-9.8	9.0-10.0				
	(9.4)				ns	ns	**	ns
Depth of bill at nostril	3.45±0.17	3.46±0.16	3.53±0.21	3.43±0.13				
	3.2-3.7	3.3-3.7	3.3-3.8	3.2-3.6				
	(3.4)				ns	ns	ns	ns
Chord of closed wing	55.02±1.00	53.97±0.46	56.90±1.02	55.37±1.13				
	53.7-56.5	53.3-54.6	55.2-58.3	53.7-56.9				
	(53.4)				*	*	***	*
Tail length	44.65±1.92	42.82±1.14	42.54±1.26	40.78±1.40				
	41.2-47.7	40.8-43.8	40.6-44.1	38.9-42.6				
	(41.9)				*	*	*	*
Tarsus length	22.52±0.42	22.13±0.90	23.30±0.45	23.58±0.61				
	22.0-23.1	20.7-23.2	22.7-24.2	22.7-24.5				
	(21.8)				ns	ns	***	**

1. Conventions for probabilities: ns = $p>0.05$; * = $p\leq0.05$; ** = $p\leq0.01$; *** = $p\leq0.001$

membership very stable. Numerous nests were found on each territory, some old and dilapidated, some evidently in use. Each group probably had several dormitory nests and perhaps dummy nests, as well as a single breeding nest. In each group a single pair appeared to breed, with only the female incubating the two white eggs, attended by her mate. However, all group members participated in care of the young and all helped to defend the territory and guard the nest from predators. Nests were roughly spherical with a side entrance, coarsely woven of grass (*Calamagrostis*) stems and leaves and lined with soft, woolly leaves of *Espeletia*. The nestling plumage was dark, between grey and black; the bill was yellow, the commissure bright greenish yellow and consicuous in the dark interior of the nest.

Members of a group foraged close together, remaining in constant contact in the dense vegetation through calls. Song was the usual form of territory defense or advertisement, often preceded by an increase in calling. Female song differed from that of males, and often females initiated song bouts. After a few seconds, one or more males of the group would join in. When several males sang, they either alternated different songs or sang the same song in unison. When one or a few group members initiated a song bout, the other members foraging low in the vicinity quickly rose to the upper levels of the vegetation and approached to join in. Further details of the ecology of this population are given by Caycedo (2001); Morales (2001) presented a quantitative characterization of the habitat.

Distribution. At present, the only definitely known population of *hernandezi* is localized around the Chisacal lake system in the north side of the Sumapaz massif. Other lakes and bogs on the south side could potentially hold another population, but were not visited due to security problems. The specimen from the Sierra Nevada de Cocuy suggests that a population exists in this area as well; a photograph of the ‘La Cueva’ valley, where the specimen was apparently collected, shows several glacial lakes like those of the Chisacal area (Olivares 1973). However, Olivares also quotes Romero, the collector, as stating that *apolinari* was “common on the upper rocky slopes”, suggesting confusion with *C. platensis*; clearly more study of this area is needed. Aside from this, the record from the Páramo del Verjón SE of Bogotá appears not to represent *hernandezi*, and there are no recent records from this area, nor from the various lakes and their surrounding páramos in the Chingaza massif (Rosselli and Stiles, unpublished data). A record from Chipaque (2470 m) on the E slope of the Eastern Andes SE of Bogotá (cf. Collar et al. 1992) might pertain to the nominate form but again, with no recent reports, the bird in question might have been a wandering individual. Thus, the distribution of *hernandezi* may comprise a small number of (perhaps only two) very localized and isolated populations in the páramos of the Eastern Andes.

Comparisons with *C. a. apolinari*. The nominate subspecies occurs in wetlands of the Cundinamarca-Boyacá altiplano at 2550-2700 m and along the shores of the Lago de Tota in Boyacá at 3015 m. Reports from the Laguna de Pedropalo (Collar et al. 1992) at 2100 m, some 20 km W of the Sabana de Bogotá, undoubtedly pertain to wandering individuals since most visits to this isolated lake have not recorded the species (Stiles, pers. obs.); the amount of available habitat seems much too small to support a viable population in any case. The specimen from El Verjón cited above might indicate that individuals of *apolinari* wander to higher elevations, as well. Although Hernández (pers. comm.) has suggested that the original habitat of the species was the now-vanished alder forests surrounding marshes and lakes, all recent evidence indicates that *C. a. apolinari* prefers stands of bulrush (*Scirpus californicus*) and to a lesser extent, cattail (*Typha latifolia*) (Borrero 1953, Varty et al. 1986, Hilty & Brown 1986, Fjeldsa & Krabbe 1990, ABO 2000, Morales 2001, Caycedo 2001). Its foraging behavior appears highly stereotyped and adapted to exploiting the bulrush substrate (Varty 1986). However, the birds will use shrubby vegetation or alders adjacent to stands of bulrush for foraging (Caycedo 2001). In these areas, *C. a. apolinari* lives in pairs or family-sized (3-4) groups; territories tend to be more linear, following stands of bulrush around areas of open water or low vegetation, and are often less than 1 ha in total extent. Nests are much more hidden and difficult to find.

The *hernandezi* males appear to have larger song repertoires than do those of *apolinari*. On average, groups of the former sang ca. 11 distinct songs, compared to 6 or 7 in*apolinari*. Also, the individual songs of *hernandezi* tended to be longer and more complex (more syllables and note types). Very few songs were shared between the subspecies, whereas two populations of *apolinari* isolated in different marshes some 10 km apart shared most of their songs (Caycedo 2001). In both populations, development of song repertoires was probably by imitation rather than invention, as might be expected given their sedentary nature (cf. Kroodsma et al. 1999).

Conservation. As a species, *C. apolinari* was classified as Critically Endangered by Collar et al. (1992) and will retain that classification in the Red Book of Colombian Birds currently being produced by the Instituto “Alexander von Humboldt” (L. M. Renjifo, pers. comm.). However, it is important to point out that the current situations of the wetland and páramo populations are quite different: they face different threats and different measures will be required to assure their survival. We hope that the naming of the páramo population will help call attention to this fact and facilitate development of appropriate measures for each population.

The chief threat facing the wetland population is habitat destruction and degradation: over 95% of its habitat in the Cundinamarca-Boyacá altiplano has been drained and destroyed, mostly in the last 50-70 years (Collar et al. 1992, ABO 2000). Moreover, most of the remaining habitat is being degraded by pollution,sedimentation, landfills, and urban development plans calling for conversion of wetlands to recreational lakes in the area of Bogotá. Although captive breeding has been touted as a possibility, the necessary knowledge of the species’ biology and experience with breeding related species simply does not exist. Moreover, without available unoccupied habitat in which to release captive-bred individuals, such a program (which would require extraction of birds from the few relatively healthy remaining wild populations) would seem doubly pointless. Clearly the top priority for conserving the nominate subspecies is the setting aside of sufficient wetland areas to support a viable population and managing them to preserve and improve habitat quality.

A further threat to the nominate population is cowbird parasitism. Several cases of parasitism of *C. apolinari* by the Shiny Cowbird *Molothrus bonariensis* have been reported since about 1995 (C. D. Cadena, unpubl. data; Velásquez et al. 2000, Caycedo pers. obs.); and it appears that the numbers of this cowbird have increased rapidly on the Sabana over the last 20-30 years (cf. Olivares 1969, ABO 2000). A primary host of this species is the endemic highland subspecies of Yellow-hooded Blackbird, *Agelaius icterocephalus bogotensis*, which sometimes sustains high rates of parasitism (Naranjo 1995). This species occupies the same habitat

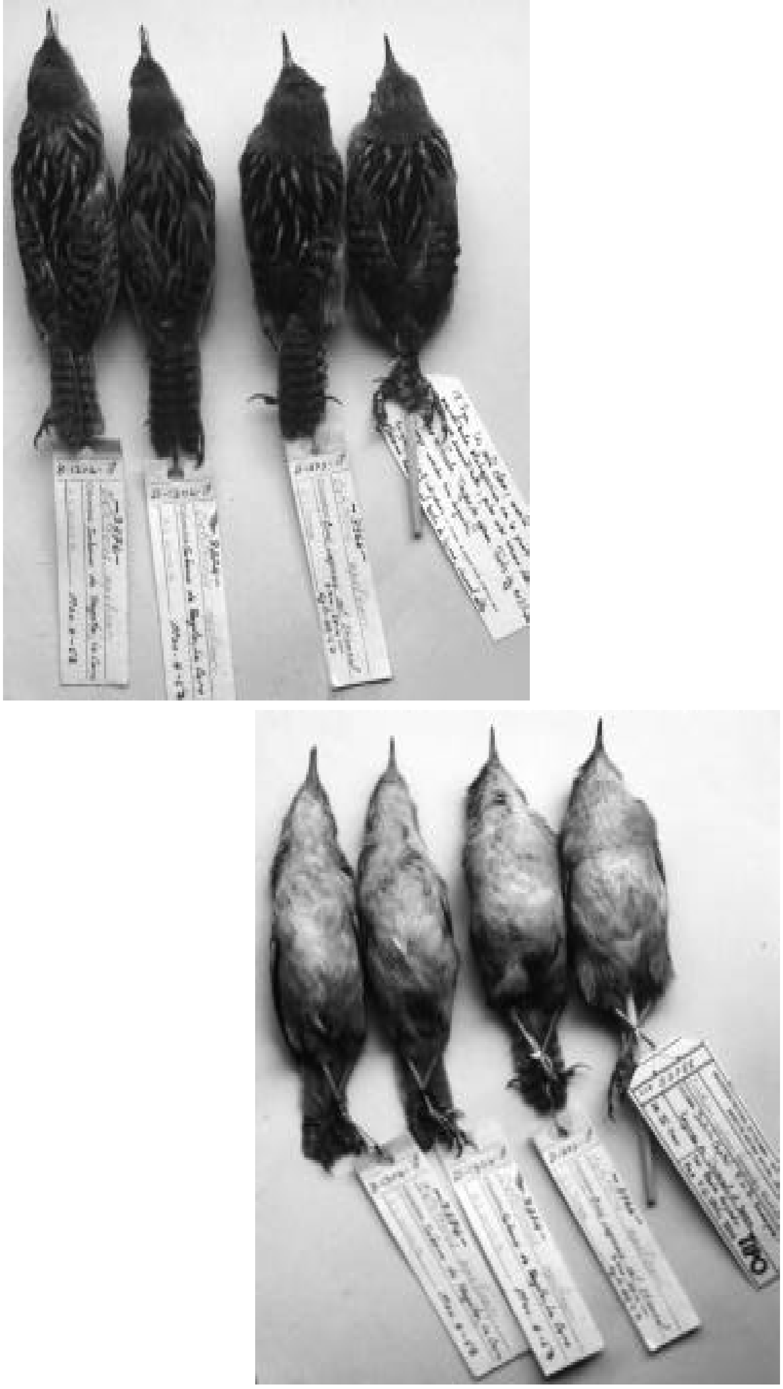

Figura 1. Dos ejemplares de *C. a. apolinari* (izquierda) y dos de *C. a. hernandezi* (derecha). El ejemplar con la cola incompleta es el holótipo de *C. a. hernandezi*. A. vista dorsal. Nótese la cola más larga de *apolinari*. B. vista ventral. Nótese la coloración más blanca de *hernandezi*.

(often the same stands of bulrushes) as *C. apolinari* and is common in the wetlands where parasitism of the latter has been observed. *C. apolinari* probably represents a secondary, relatively minor host for the cowbird but given the opposite trajectories of the two populations, such parasitism must be seen as a severe threat and some form of cowbird control may be mandatory, especially in the small wetlands around Bogotá.

Although there has been considerable uncertainty and confusion regarding the situation of the Chisacal population of *hernandezi* (see Collar et al. 1992 for details), it now appears that this population is relatively healthy. Its habitat is nominally protected in the Parque Nacional Natural Sumapaz, but because of the tense security situation in Colombia it appears to have survived more because it is not of great economic importance than through strong, effective protection. There is thus no immediate danger to *hernandezi* unless current conditions of land use change (although the possible effects of global warming and increased radiation on this high-elevation population remain to be assessed). However, any population so localized must be considered highly vulnerable. An assessment of the Sierra Nevada del Cocuy population and search for additional populations in intervening areas must be given high priority in order to determine the true status of *hernandezi*; the Sierra Nevada del Cocuy is also given nominal protection as a national park but here too, little effective control can be exercised under the current circumstances. Improving the effectiveness of habitat protection in existing parks against possible human encroachment and burning for grazing or potato cultivation, seems the best hope for long-term survival of *hernandezi*.

ACKNOWLEDGMENTS

FGS thanks the curators and staffs of the following museums for permission to examine specimens in their care, and for assistance rendered during his visits: Nathan Rice and Leo Joseph (Academy of Natural Sciences of Philadelphia), Paul Sweet and Mary LeCroy (American Museum of Natural History) and Hno. Roque Casallas (Museo de la Universidad de La Salle, Bogotá). His work at AMNH was made possible through a Chapman Memorial Fund grant. PC thanks Donald E. Kroodsma for supplying equipment, ideas and advice on bioacoustics during her thesis work, which was financed by the Sociedad Antioqueña de Ornitología SAO and BirdLife International. The Unidad de Parques Nacionales Naturales de Colombia supplied permits and logistic assistance for work in Sumapaz; the Fundación Humedal La Conejera, especially Germán Galindo and Luis Jorge Vargas, facilitated work in this marsh. Andrea Morales, Andrés David Caycedo, María Isabel Moreno, Fernando Arbeláez y Alejandro Niño provided help and companionship in the field. Finally, we thank Arturo Rodríguez for help in the museum of the Instituto de Ciencias Naturales.

This work was supported by the Vireo masteri grant, Sociedad Ornitólogica de Antioquia SAO and Bird Life International, and by Donald Kroodsma, University of Amherst, Massachussetes.

LITERATURE CITED

Asociación Bogotana de Ornitología. 2000. Las aves de la Sabana de Bogotá: guía de campo. ABO & CAR, Bogotá.

Borrero, J. I. 1953. Status actual de *Zenaida auriculata* y *Leptotila plumbeiceps* en el

Departamento de Caldas y de *Cistothorus apolinari* en la región de Bogotá. Lozania 1:7-12.

Caycedo, P. 2001. Estudio comparativo de canto entre poblaciones del Soterrey de Apolinar (*Cistothorus apolinari*, Troglodytidae) en la Cordillera Oriental de los Andes colombianos. Tesis, Universidad Nacional de Colombia, Bogotá.

Chapman, F. M. 1917. The distribution of bird-life in Colombia. Bull. Amer. Mus. Nat. Hist., no. 36.

Collar, N. J., L. P. Gonzaga, N. Krabbe, A. Madroño Nieto, L. G. Naranjo, T. A. Parker & D. J. Wege. 1992. Threatened birds of the Americas: the ICBP/IUCN Red Data Book. ICBP, Cambridge.

Fjeldsa, J. & N. Krabbe. 1990. Birds of the High Andes. University of Copenhagen and Apollo Books, Copenhagen.

Hilty, S. L. & W. L. Brown. 1986. A guide to the birds of Colombia. Princeton University Press, Princeton, NJ.

Kroodsma, D. E., J. E. Sánchez, D. Stemple, E. Goodwin, M. DaSilva & J. E. Vielliard. 1999. Sedentary lifestyle of neotropical Sedge Wrens promotes song imitation. Anim. Behav. 57:855-863.

Morales R., A. 2001. Uso y requerimientos de hábitat del cucarachero de pantano, *Cistothorus apolinari*. Tesis, Pontificia Universidad Javeriana, Bogotá.

Naranjo, L. G. 1995. Patrones de reproducción en dos poblaciones aisladas de *Agelaius icterocephalus* (Aves: Icteridae). Caldasia 18:89-100.

Olivares, A. 1969. Las aves de Cundinamarca. Imprenta Universidad Nacional, Bogotá.

Olivares, A. 1973. Aves de la Sierra Nevada del Cocuy, Colombia. Rev. Acad. Colomb. Ciencias Exactas, Físicas y Naturales 14:39-48.

Smithe, F. 1975, 1981. Naturalists' Color Guide. American Museum of Natural History, New York.

Varty, N., J. Adams. P. Espin & C. Hambler. 1986. An ornithological survey of Lake Tota, Colombia, 1982. ICBP Study Report 12, ICBP, Cambridge.

Velásquez-Tibatá, J., A. Gutiérrez & E. Carrillo. 2000. Primer registro de parasitismo reproductivo en el Cucharachero de Pantano *Cistothorus apolinari* por el Chamón Maicero *Molothrus bonariensis*. Cotinga 14:102.

Recibido: 22/02/2002
Aceptado: 05/04/2002